Improving Performance of Your CMMI Mature Organization Through
Lean and Agile Techniques

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Report Documentation Page

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CMMI & Agile at Odds?

CMMI

Agile

CMMI – Capability Maturity Model Integration

Will demonstrate multiple Lean & Agile techniques that can help improve performance without jeopardizing CMMI compliance

Goal of CMMI V1.3 is to improve model's coverage of Agile approaches

Not theory, based on actual client case studies…

Presentation Structure:
What You Will Learn (9 Techniques)

✓ **Case Study 1 (LACM)**

- **4 Techniques increase agility CMMI Level 3 Organization**

And how techniques can improve CMMI implementation
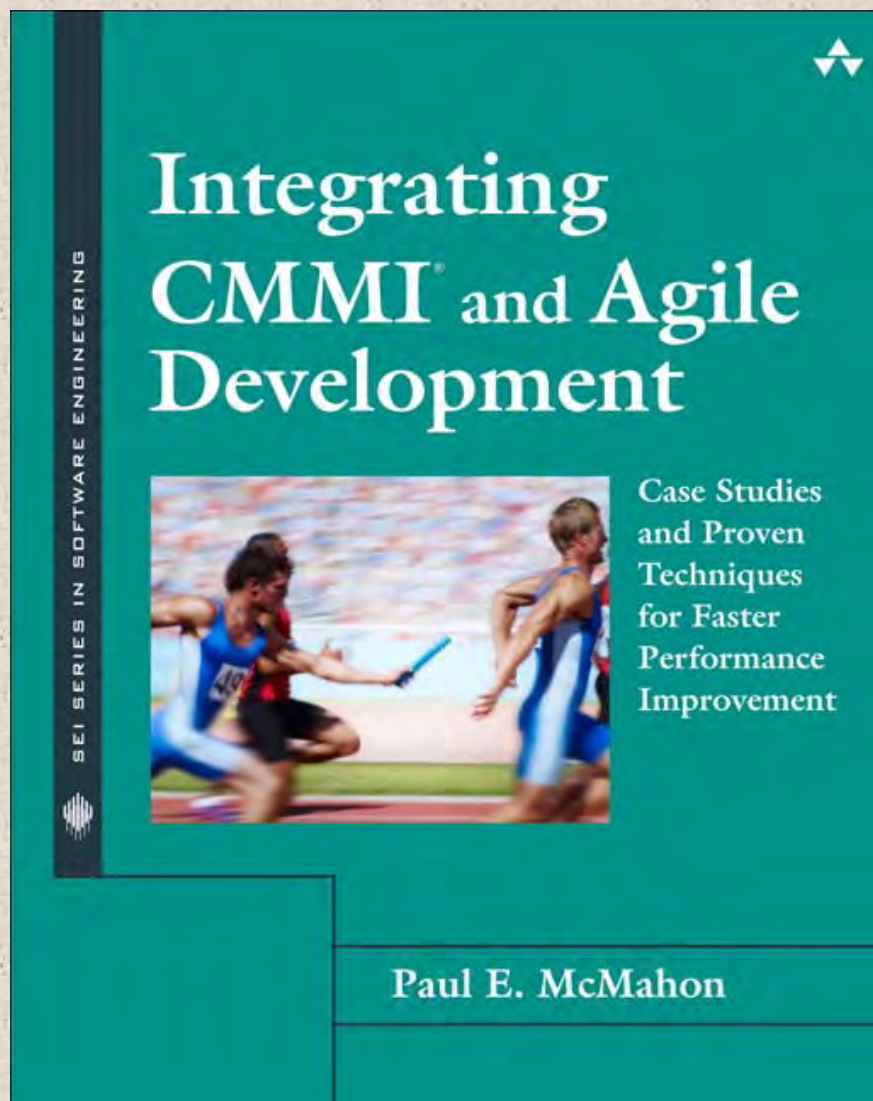
✓ **Case Study 2 (RAVE)**

- **Alternate technique increase agility Level 5 Organization**

And advantages and disadvantages
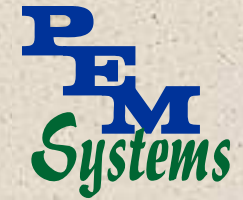
✓ **Case Study 3 (DART)**

- **4 Techniques using "hybrid" agile in CMMI Organization**

Focus on people challenges

Case Studies discussed in presentation described in greater detail in book.
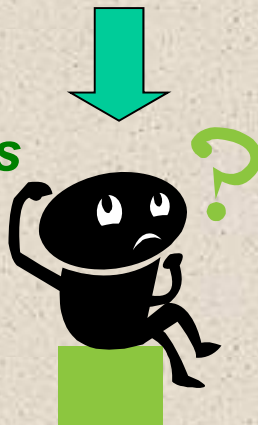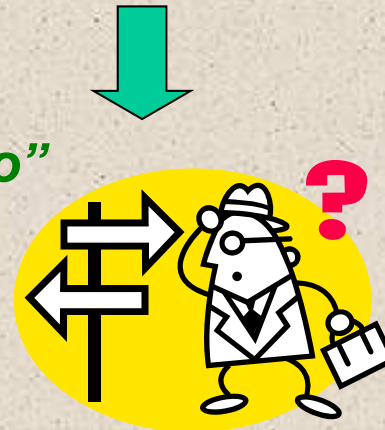
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Fundamental Guidance

Not dictated practices

CMMI is process improvement reference model intended to help you ask the right questions leading to best decisions for your organization

Example questions

Agile provides potential "how-to" options

**CMMI is about "What" must do
Agile techniques provide <u>potential</u> "How-to" options**
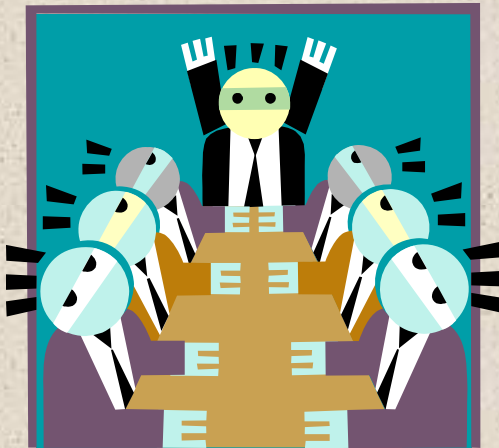
Case Study 1 Background: LACM

LACM successful high tech organization

Focus on U.S. defense market

2007- Over 50 active projects; Only 2 any difficulty
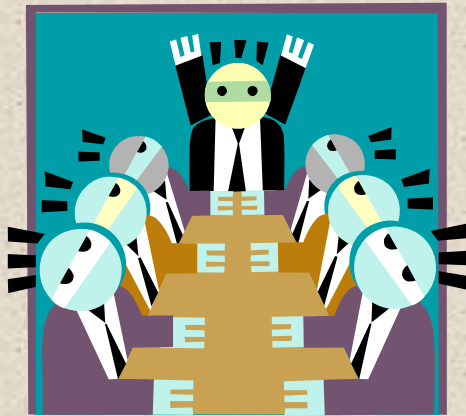
CMM Level 3 many years ago; 2008 CMMI Level 3

2008 CMMI motivation:

- Vice-President (VP) understood could use CMMI to address changing customer needs

- He knew his organization needed to change improving performance in key areas

Where do we start?

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Where Start To Improve Performance When Using CMMI?

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- ◆ **Not single required starting point**

  LACM one of best…

- ◆ **VP knew needed changes, also cautious not to break what was working**

✓ *"Why are our customers coming back to us now over the competition?"*

Presentations, Open forum discussions..

This is way LACM CMMI effort started…

✓ *"What is the unique value this organization brings to its customers?"*

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Technique 1:
Start by Asking Key Questions to Focus Objectives

- ◆ **Many don't start this way**

Common "non-lean" approach

- ◆ **Reason: Most don't have unlimited process improvement budgets**

All CMMI Expected Practices…

Recommended start point

*Specific Practices in CMMI model

"Establish….. process… objectives …"*
"Establish measurement objectives"*

Help you focus improvement efforts on performance

Measurement Example

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What Data Should You Collect?

*Many organizations using CMMI
first collect data related to each process area
and figure out later how might use*

*The "__lean approach__" …ask
following questions first…*

✓ *"Who will use data if collect it?"*
✓ *"How does data relate to objectives?"*

**Makes sense if already using CMMI and looking
to improve, or just starting out with CMMI effort**

*Why involve
workers?*

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Why Involve Your Workers?

Presentations.. Encouraged open forum discussions...

…including those who understood how work got done

- ◆ **Led to realization of value company received from product reuse-- but most processes written for new development**

- ◆ **Discussions also led to a cause of employee turn-over**
  - ✓ **Recent exit interviews had found people leaving because felt little relevant training**

- ◆ **Company did have training program, but training & processes not aligned with real issues faced on job**
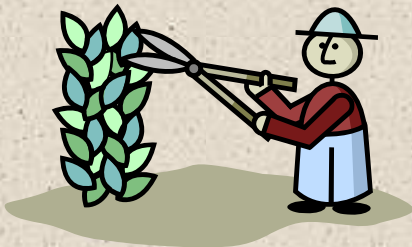
Led to Technique 2
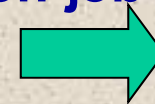
Technique 2:
Pruning the Processes
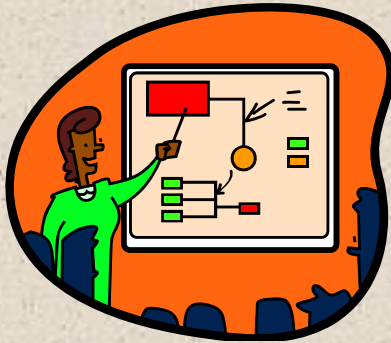
- ◆ **Built flow diagrams of what people really did to get their job done**
  - ✓ **Annotated with process assets really used**
  - ✓ **Not theoretical diagrams**

- ◆ **Anything not on a diagram became a candidate for elimination**

- ◆ **Led to more questions:**
  - ✓ *"If no one used something, why there?"*
  - ✓ *"Were we wasting time training use of certain process assets?"*
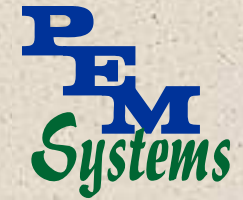 - ✓ *"Did we believe if used, it would help get job done?"*

"Pruning the Processes" led to streamlined processes & improved training

Next: Example

Pruning Example:
Peer Review Process

**P E M
Systems**

- ◆ **Peer Review process required:**

  - ✓ **Great deal of data collected about each defect**

  - ✓ **Periodic analysis of the collected data**

- ◆ **Flow diagrams showed people entered the data, but no one analyzed it**

Example: Helped improved performance!

- ◆ **Further investigation showed requirements for data had been added to process because someone <u>wrongly</u> thought CMMI required it**

Pruning/Streamlining led to <u>more</u> <u>effective</u> peer review process

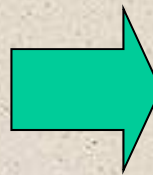*Also, onerous review process had discouraged comments*

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Insight

Historical tendency: Read things into CMMI model that aren't there

Creates unnecessary non-value-added work

By using CMMI as intended, can align real processes with real process objectives

Goes back to fundamental guidance… not set of dictated practices…

But how was LACM able to do this?

And why don't more organizations do this?…(2 pieces to answer…)

Technique 3:
Use CMMI Model Less Formally

◆ **LACM used the CMMI model first to:**

  ✓ **Help discover where needed improvements to help performance**

 ✓ **Then prioritized work and focused on those value added improvements**
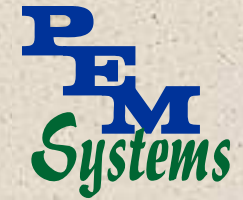
What happens too often...

Lesson:
When process improvement teams face pressure to achieve a formal CMMI level and aren't given adequate time to work real issues, real performance improvements are rarely achieved

1st Reason why more don't do this:

Next: 2nd reason relates to what pruning really requires…
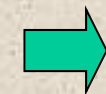
What Pruning Really Requires

- **People in trenches who really understand how job done**

Process professionals can facilitate

- **Often these people in the trenches are the best performers & the busiest people in the company**

Nevertheless…

If experiencing similar symptoms as LACM, consider allocating percentage of time of key people to this effort

Small investment in pruning might pay high dividends in long run

What Should Your Process Repository Look Like?

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> **Some wrongly believe the CMMI requires a "heavyweight" process repository superstructure**

- ✓ **LACM is large and product centric**
- ✓ **LACM mandates tools, and standards**
- ✓ **LACM has some detailed work instructions**

- ✓ **BOND is small and service centric**
- ✓ **BOND mandates few tools, few standards**
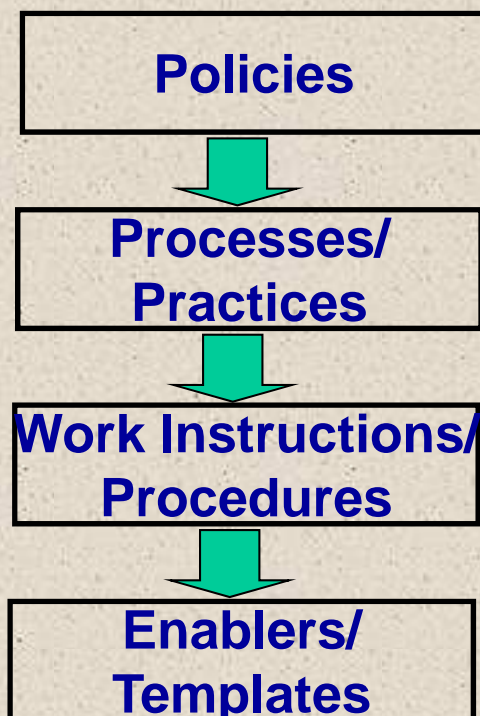- ✓ **BOND has no detailed work instructions**

LACM & BOND are CMMI Level 3

Note: LACM and BOND different business needs…

> **Process repository structure depends on your business need**

Next example… 16

Process Repository Structures

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Traditional
(LACM like structure)

Agile
(BOND like structure)

Policies

↓

Processes/ Practices

↓

Work Instructions/ Procedures

↓

Enablers/ Templates

Policies/ Processes

↓

How-to Guides/ Tailoring Aids
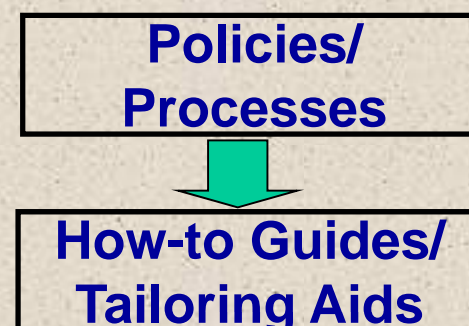
Different Repository Structures, Both CMMI "Compliant" ** CMMI doesn't mandate repository structure

But if you want to encourage agility & improve performance….

***Achieves intent**

Technique 4: Use
Agile/Lean Process Repository Structure

PEM Systems

And process packaging guide…

Keep "must dos" packaged separately from "guidelines"

Agile/Lean structure

Policies/ Processes	← "Must dos" No one tailors ←	Rationale 1: Simplifies Tailoring Don't need discuss

⬇

How-to Guides/ Tailoring Aids	← Aids tailoring, Integrated with Project Planning ←	"How to" decisions

Rationale 2: Also, addresses concern many have related to myth that agile organizations don't follow processes

Note: LACM through "pruning" is evolving toward this structure

e.g. eliminating work instructions not used

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Case Study 2 Background: RAVE

RAVE Large CMMI Level 5 Organization

Focus on U.S. defense market

Grassroots

2005 recognized "stealth agile" movement

CMMI Level 5 processes didn't recognize

Different approach to agility:
- **Did not modify existing CMMI processes**

Pros/Cons?

- **Handle agile through "tailoring" process & "agile developers guide"**

Used during project startup planning..

Technique 5:
Consider Developer's Guide to Aid Agility

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- **Advantages**
  - ✓ **No risk to proven level 5 processes**
    - • **(advantage if working well)**
  - ✓ **Doesn't require critical personnel in "trenches"**

- **Disadvantages**
  - ✓ **If hearing:**
    - • **"processes don't help"**
    - • **"create work without value"**
  - **…then this approach won't help**
  - **…also may result in redundant efforts**
    - • **E.g. product reviews, progress reporting**
  - **…or may result in loss of key "must dos" when tailor**

Note: Consider right answer for you could be combination of LACM & RAVE approach

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Case Study 3 Background: DART

DART – Legacy modernization project in traditional CMMI Level 3 organization

Employed "hybrid" agile-traditional approach due to project constraints and lack of agile knowledgeable people

Could not deliver incrementally to end user Delivered every 30 days to lab environment

- *Key Challenge: Deliver in 6 months*
- *Results:*
- *Team accepted challenge*
- *Unfortunately took 12 months*
- *Customer pleased*
- *Differing views how well managed*

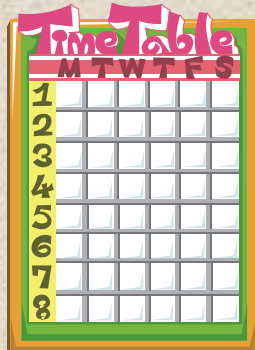*What are common people issues with hybrid efforts?*

Three (3) Common People Issues On Hybrid Agile Projects

✓ **Difficulties Scheduling & Estimating the Work**

✓ **Difficulties Collaborating Closely With a Customer**

- **Difficulties Managing Scope**

✓ **Lack of & Wrong Type of Training**

Common Issue 1: Difficulties Scheduling & Estimating the Work

✓ **Why did team think could hit 6 months & then miss by so much?**

   Scrum teams known for hitting schedule!

✓ **Answer related to how work scheduled & estimated**

   • **With Scrum work high value, high risk areas early**

   • **Team members participate in scheduling, estimating & <u>negotiating</u> work**

Important to → *hitting schedule!*

So why is this an issue particularly with "hybrid agile"?

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A Common Pitfall
On Hybrid Agile Efforts

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Traditional projects often don't ask team members or train them in how to estimate & negotiate…

✓ **On DART because schedule was aggressive, & team members didn't have previous agile experience, team leader estimated & scheduled alone**

✓ **Unfortunately didn't have adequate knowledge of high risk areas**

Common Pitfall: Not engaging & training team in the scheduling, estimating & negotiating

How address? ➡ *Next technique*

Technique 6:
Sutherland 10% Rule

P E M
Systems

✓ **Jeff Sutherland, co-founder of Scrum, recommends allocating 10% of project team's time to work next Sprint's backlog**

Too often under pressure think best to keep team "heads down" working

You'll get to the goal faster working together

Even if "small" amount of time

Engage your team members who know best where high risk areas exist in scheduling & estimating

Note: You may need to spend more time mentoring them in "self-estimating" & negotiating
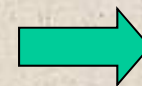
Common Issue 2: Difficulties Collaborating Closely With a Customer

✓ **On DART original requirements grew due to demanding customer working closely with a developer who didn't know how to interact appropriately with that customer**
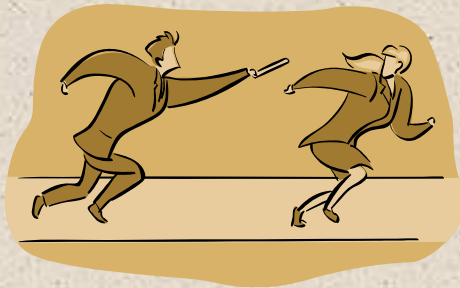
So how do you help your people learn to collaborate?

Next technique

Technique 7A:
Manage Collaboration Through Scope Artifact

- ✓ **With agile approaches don't do all requirements up front**

- ✓ **Collaborate to ensure getting best value for customer**

But this can be risky if people lack experience & have fixed cost and schedule…

Need techniques to bound work...

Scope artifact is complete, but high level requirements, written at "what" not "how" level & doesn't grow like Product Backlog

But not a guarantee-- can be misused

Related Issue:
Difficulties Managing Scope

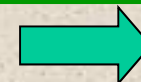**PEM Systems**

OOPS!

✓ **DART developed Scope Artifact & got <u>some</u> stakeholders to agree, but didn't get <u>all</u> key team members to <u>use it</u>**

Scope artifact on DART was set of high level Use Cases...

Common Pitfall:
Building a scope artifact, but failing to flow it down

So how do you teach your people to collaborate <u>appropriately</u> with a scope artifact?

➡ *Next technique*

Technique 7B:
Use "Push-Pull" For Effective Collaboration

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- ✓ **Scope artifact not intended to curtail agility and collaboration**

- ✓ **Because scope artifact written at the "what", "not how" level, it allows flexibility in implementation**
  - • **This can aid collaboration**

- ✓ **Team members taught "push-pull"**

Negotiate

Push-pull means can pull higher priority work in, but only if push equal value work out

Train customer too!

Scope artifact is reference for "push-pull" Must "pull" from agreed to scope

Common Issue 3:
Lack of & Wrong Type of Training

✓ **It is a common myth that when using agile approaches people require less training**

✓ **Traditional comprehensive "fire-hose" approaches to training lack effectiveness**

- **Can be overwhelming**
- **Often can't find what need later when need it**

✓ **Too often train wrong things**

- **E.g. need training negotiation (push-pull)**

So how can you provide the right training your people need in a more agile/lean way?

Next technique

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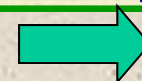
Technique 8:
Use "Just in time" Scenario Training

✓ **Break training down into specific scenarios that can be rapidly accessed on-line when needed**

✓ **Supports "rapid refresh" when need**

- **Focus on key "stretch areas" or weaknesses**

✓ **Can reduce overall training cost**

Think of "Scenario Training" as "Just-in-time" coaching

Example:
"Just in time" Scenario Training

✓ **Recall pruning at LACM led to streamlining of onerous peer review process**

- **Peer review users guide was over 50 pages**

✓ **Just in time scenario developed:**

- **Initiating a Peer Review**
- **Making a Peer Review comment**
- **Processing a Peer Review comment**
- **What data required and why!**

Could also develop "push-pull" training Scenarios…

✓ **Each scenario individually accessible on-line for quick refresh when need**

Summary Techniques

- ✓ **1. Ask key questions to focus objectives**
- ✓ **2. Prune the processes**
- ✓ **3. Use CMMI model less formally**
- ✓ **4. Use Agile/Lean repository structure**
- ✓ **5. Consider Developer's Guide to aid agility**
- ✓ **6. Use Sutherland 10% rule**
- ✓ **7A. Manage collaboration through scope artifact**
- ✓ **7B. Use "push-pull" for effective collaboration**
- ✓ **8. Use "just in time" scenario training**

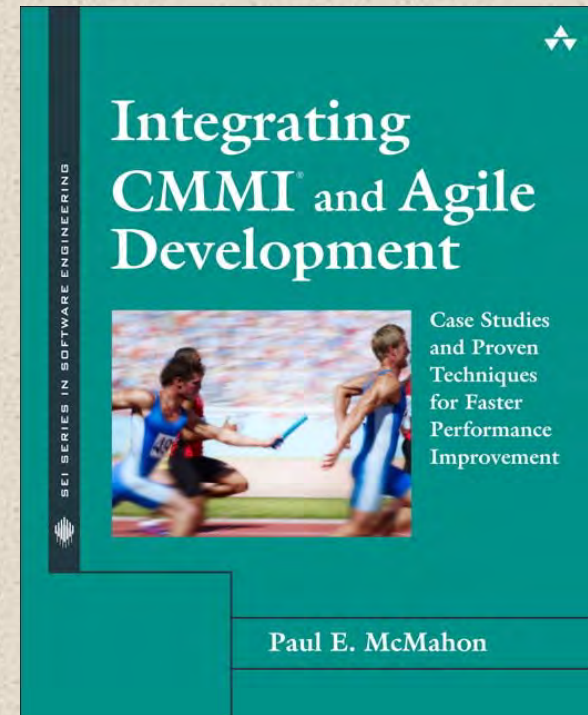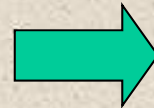*Don't try implement all. Pick ones that can bring greatest value in your situation*

Practical techniques you can implement in your organization today
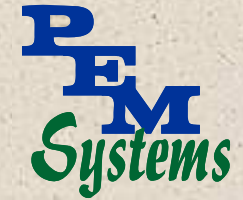
Questions ???

- ◆ **Contact Information**
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  - ✓ **www.pemsystems.com**

- ◆ **More information**

Integrating CMMI and Agile Development

SEI SERIES IN SOFTWARE ENGINEERING

Case Studies and Proven Techniques for Faster Performance Improvement

Paul E. McMahon

Acronyms

Acronyms

CMMI – Capability Maturity Model Integration

Scrum– Not an acronym, mechanisms in game of rugby for getting an out-of-play ball back into play